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Feero et al.

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(54) **STORAGE CIRCUITRY AND METHOD FOR PROPAGATING DATA VALUES ACROSS A CLOCK BOUNDARY**

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See application file for complete search history.

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(57) **ABSTRACT**

A storage circuit and method are provided for propagating data values across a clock boundary between a first clock domain and a second clock domain. A storage structure is provided with at least one entry, and write circuitry performs write operations in the first clock domain, where each write operation writes a data value into an entry of the storage structure identified by a write pointer. The write circuitry alters the write pointer between each write operation. Write pointer synchronization circuitry then receives the write pointer and synchronizes the write pointer indication to the second clock domain over a predetermined number of clock cycles of the second clock domain. Read circuitry performs read operations in the second clock domain, with each read operation reading a data value from an entry of the storage structure identified by a read pointer. However, for a read operation to be performed, it is necessary that the synchronized write pointer indication indicates that there is a data value written into the storage structure that is available to be read. Early update circuitry is configured, for a write operation, to alter the write pointer indication provided to the write pointer synchronization circuitry a number of clock cycles of the first clock domain before the write operation is performed. That number of clock cycles is chosen dependent on the difference in clock speed between the first clock domain and the second clock domain, and the predetermined number of clock cycles of the second clock domain taken by the write pointer synchronization circuitry to synchronize the write pointer indication to the second clock domain. Such an approach enables at least a part of the latency of the write pointer synchronization circuitry to be hidden, thereby improving performance of the storage circuitry.

16 Claims, 6 Drawing Sheets

